Exam Time: 45 mins Name: Student ID: Seat ID:

本測驗試題共有三大題，測驗時間為 45 分鐘。

請使用 PSpice 或與您電腦相容之電路模擬軟體進行作答。

每題均需附上**在 PSpice 裡建構的電路圖**，請截圖附上。未附圖者，該大題將斟酌給分。

請將模擬出來的答案或曲線圖截圖附上，並請回答相關問題。

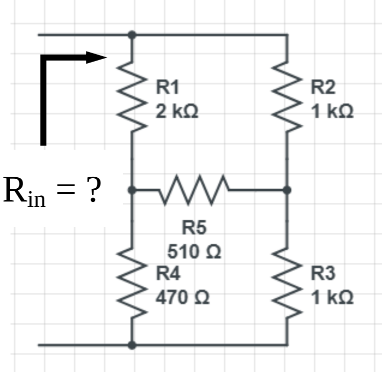
作答時，**請務必標示清楚題號**。如有標示不清，以致影響評分，後果請自行負責。

請於測驗時間結束前上傳 PDF 檔。逾時或以其他格式上傳，造成無法判讀，後果請自行負責。

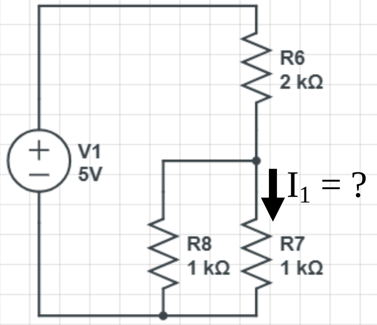
Q1. (16 %)

(i) Please determine the values of R_{in}, I_1, and I_2 marked in Figs. (a)–(c).

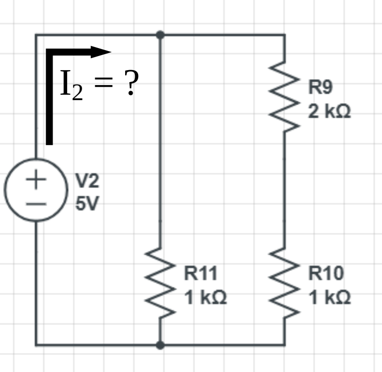
(ii) Please describe how to simulate the circuit in Fig (a) and obtain R_{in}.



(a)



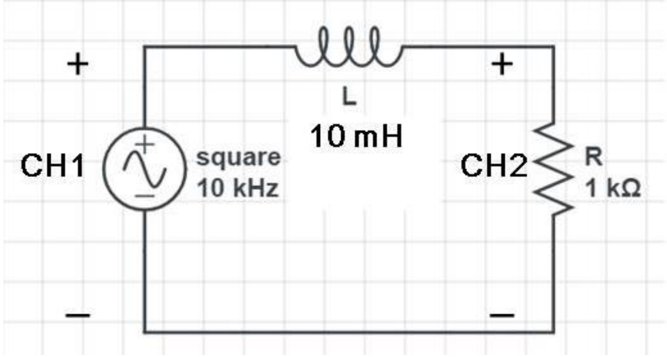
(b)



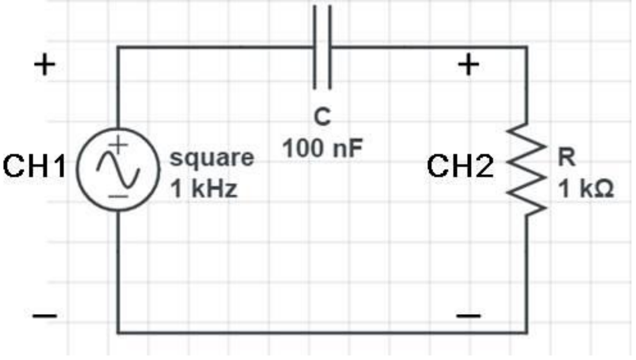
(c)

Q2. (24%)

1. Please connect the given circuits shown in (d) and (e), and plot the input and output waveforms in Y-t mode and X-Y mode. The peak value of the input voltage in CH 1 is 1 V.



(d)



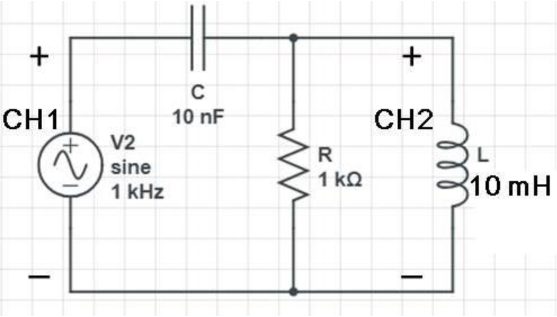
(e)

2. Is (d) a high-pass / low-pass / band-pass / notch / no-pass / all-pass filter? Please plot the magnitude and phase Bode diagrams of (d), and indicate the value of the 3-dB frequency. You have to change the input function from the square wave to the sine wave.

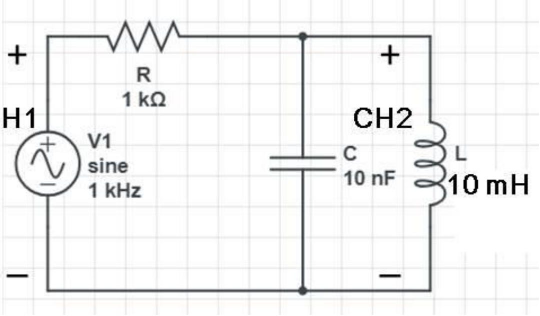
3. Is (e) a high-pass / low-pass / band-pass / notch / no-pass / all-pass filter?

Q3. (60%)

Two circuits are shown as below, and the output is connected to the inductances. Please answer the following questions.



(f)



(g)

1. Is (f) a high-pass / low-pass / band-pass / notch / no-pass / all-pass filter?

2. Is (g) a high-pass / low-pass / band-pass / notch / no-pass / all-pass filter?

3. (1) Please plot the magnitude and phase Bode diagrams of (f)
   (2) Please indicate the value of the 3-dB frequency.
   (3) Please indicate the value of the central frequency.

4. (1) Please plot the magnitude and phase Bode diagrams of (g)
   (2) Please indicate the value of the 3-dB frequency.
   (3) Please indicate the value of the central frequency.
   (4) Do the circuits shown in (f) and (g) have the same central frequency? Why?